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(FILE 'HOME' ENTERED AT 16:51:16 ON 19 FEB 2002)

     FILE 'MEDLINE, AGRICOLA, CANCERLIT, SCISEARCH, CAPLUS, BIOSIS, MEDICONF'
     ENTERED AT 16:51:23 ON 19 FEB 2002
L1          735 S HYDROGEL AND ALGINATE
L2          279 S L1 AND CALCIUM
L3       184369 S L2 AND SHRINK? OR SWELL? OR MAINTAIN? UNIFORM?
L4           32 S L2 AND (SHRINK? OR SWELL? OR MAINTAIN? UNIFORM?)
L5           28 DUP REM L4 (4 DUPLICATES REMOVED)
L6           28 SORT L5 PY

     FILE 'STNGUIDE' ENTERED AT 17:03:20 ON 19 FEB 2002

     FILE 'MEDLINE, AGRICOLA, CANCERLIT, SCISEARCH, CAPLUS, BIOSIS, MEDICONF'
     ENTERED AT 17:04:01 ON 19 FEB 2002
L7           70 S L1 AND (SHRINK? OR SWELL? OR MAINTAIN? UNIFORM?)
L8           54 DUP REM L7 (16 DUPLICATES REMOVED)
L9           54 SORT L8 PY
L10          22 S L9 AND PY<=1998

     FILE 'STNGUIDE' ENTERED AT 17:17:18 ON 19 FEB 2002
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     (FILE 'HOME' ENTERED AT 16:51:16 ON 19 FEB 2002)

     FILE 'MEDLINE, AGRICOLA, CANCERLIT, SCISEARCH, CAPLUS, BIOSIS, MEDICONF'
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     FILE 'STNGUIDE' ENTERED AT 17:03:20 ON 19 FEB 2002

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L7             70 S L1 AND (SHRINK? OR SWELL? OR MAINTAIN? UNIFORM?)
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L9             54 SORT L8 PY
L10            22 S L9 AND PY<=1998

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L10 ANSWER 5 OF 22 SCISEARCH COPYRIGHT 2002 ISI (R)
AN 96:646086 SCISEARCH
TI PREPARATION AND IN-VITRO RELEASE OF MELATONIN-LOADED MULTIVALENT CATIONIC **ALGINATE** BEADS
SO ARCHIVES OF PHARMACAL RESEARCH, (**AUG 1996**) Vol. 19, No. 4, pp. 280-285.
ISSN: 0253-6269.
AU LEE B J (Reprint); MIN G H; KIM T W
AB The sustained release dosage form which delivers melatonin (MT) in a circadian fashion over 8 h is of clinical value for those who have disordered circadian rhythms because of its short half-life. The purpose of this study was to evaluate the gelling properties and release characteristics of **alginate** beads varying multivalent cationic species (Al+++, Ba++, Ca++, Mg++, Fe+++, Zn++). The surface morphologies of Ca- and Ba-**alginate** beads were also studied using scanning electron microscope (SEM). MT, an indole amide pineal hormone was used as a model drug. The Ca++, Ba++, Zn++, Al+++ and Fe+++ ions except Mg++ induced gelling of sodium **alginate**. The strength of multivalent cationic **alginate** beads was as follows: Al+++ much less than Fe+++<Zn++ <Ca(++)congruent to Ba++. In case of Al+++, the induced **hydrogel** beads were very fragile and less spherical. fe-**alginate** beads were also fragile but stronger compared to Al-**alginate** beads. Ba-**alginate** beads had a similar gelling strength but was less spherical when compared to Ca-**alginate** beads. Zn-**alginate** beads were weaker than Ca- and Ba-**alginate** beads. Very crude and rough crystals of Ba- and Ca-**alginate** beads at higher magnifications were observed. However, the type and shape of rough crystals of Ba- and Ca-**alginate** beads were quite different. No significant differences in release profiles from MT-loaded multivalent cationic **alginate** beads were observed in the gastric fluid. Most drugs were continuously released up to 80% for 5 h, mainly governed by the passive diffusion without **swelling** and disintegrating the **alginate** beads. In the intestinal fluid, there was a significant difference in the release profiles of MT-loaded multivalent cationic **alginate** beads. The release rate of Ca-**alginate** beads was faster when compared to other multivalent cationic **alginate** beads and was completed for 3 h. Ca-**alginate** beads had a very long lag time (7 h) and then rapidly released thereafter. MT was continuously released from Fe-and Zn-**alginate** beads with initial burstout release. It is assumed that

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the different release profiles of multivalent cationic **alginate** beads resulted from forces of **swelling** and disintegration of **alginate** beads in addition to passive diffusion, depending on types of multivalent ions, gelling strength and drug solubility. It was estimated that 0.2 M CaCl2 concentration was optimal in terms of trapping efficiency of MT and gelling strength of Ca-**alginate** beads. In the gastric fluid, Ca-**alginate** beads gelled at 0.2 M CaCl2 concentration had higher bead strength, resulting in the most retarded release when compared to other concentrations. In the intestinal fluid, the decreased release of Ca-**alginate** beads prepared at 0.2 M CaCl2 concentration was also observed. However, release profiles of Ca-**alginate** beads were quite similar regardless of CaCl2 concentration. Either 200 low or high CaCl2 concentrations may not be useful for gelling and curing of **alginate** beads. Optimal CaCl2 concentrations must be decided in terms of trapping efficiency and release profiles of drug followed by curing time and gelling strength of **alginate** beads.

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FILE 'MEDLINE, AGRICOLA, CANCERLIT, SCISEARCH, CAPLUS, BIOSIS, MEDICONF' ENTERED AT 16:51:23 ON 19 FEB 2002

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L5           28 DUP REM L4 (4 DUPLICATES REMOVED)
L6           28 SORT L5 PY
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L6 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 1995:703612 CAPLUS
DN 123:93214
TI Thermo-responsive gels
SO Radiat. Phys. Chem. (1995), 46(2), 185-90
CODEN: RPCHDM; ISSN: 0146-5724
AU Ichijo, Hisao; Hirasa, Okihiko; Kishi, Ryoichi; Oowada, Mika; Sahara, Kanako; Kokufuta, Etsuo; Kohno, Seiji
AB Porous, fibrous, homologous, etc., thermo-responsive gels of poly(vinyl Me ether) (PVME) were prepd. by .gamma.-irradn. Thermal characteristics of these gels were analyzed and several thermo-responsive devices were constructed. The PVME porous gel **swelled** and **shrinked** much faster than the homogeneous and dense gels. A fibrous gel was formed as **alginate** was crosslinked in a coagulation bath by the formation of crosslinking points with Ca2+. Since CaCl2 decreased the lower crit. soln. temp. of PVME, PVME aggregated and did not dissolve in a warm bath. Because PVME was covalently crosslinked and Ca **alginate** was decompd. completely in the course of .gamma.-irradn., only PVME remained in a shape of fiber. After the decompd. Ca **alginate** was washed out, the fibrous **hydrogel** of PVME had a very porous structure. As the PVME gel fiber was very porous and fine (400-600 .mu.m), it reversibly **swelled** and **shrinked** fast within 8 min. Models of artificial muscle and finger and an automated gel valve were constructed and evaluated.

L6 ANSWER 10 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 1997:489321 CAPLUS
TI Application of **alginate** polyelectrolyte ionotropic **hydrogels** for blocking of microscopic channels in teeth
SO Book of Abstracts, 214th ACS National Meeting, Las Vegas, NV, September 7-11 (1997), POLY-179 Publisher: American Chemical Society, Washington, D. C.
CODEN: 64RNAO
AU Linden, L. Aa.; Rabek, J. F.; Nie, J.
AB The idea of blocking the microscopic channels (tubules) in tooth dentin by polymeric materials, in order to decrease the fluid permeability through the native **hydrogel** and protect against tooth decay, has been developed in our lab. over the last five years. Recently we have found that **calcium alginate hydrogels** (CaAH) can be successfully used for the same purpose. Aq. solns. of **alginates** gelatinize with di- or tri-valent ions. In this paper we present results of **swelling**/deswelling of CaAH obtained from various Ca salts under different exptl. conditions, SEM microphotographs of CaAH gels, and their blocking of tubules in the human dentin.

L6 ANSWER 15 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 2000:336750 CAPLUS
DN 133:286389
TI Blocking of microchannels in teeth by **alginate** polyelectrolyte ionotropic **hydrogels**
SO Wiley Polym. Networks Group Rev. Ser. (1999), 2(Synthetic versus

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Biological Networks), 415-427
CODEN: WPNSFV
AU Linden, Lars-Ake; Jun, Nie; Adamczak, Ewa; Rabek, Jan F.; Wrzyszczynski, Andrzej
AB Microchannels in teeth can be blocked by **alginate** polyelectrolyte ionotropic **hydrogels** under clin. conditions with the purpose to reduce dentinal hypersensitivity and hinder bacterial invasion (caries). The ionotropic gelation of **alginate** with bivalent cation such as Ca++, give products that are compatible with most bioactive materials. **Alginate hydrogels** have very high water **swelling** capacities (up to 4000%), and can serve as media for ion flow in micro-channels of teeth. Diffusion of **alginate** into the micro-channels depends on the mol. wt. of the **alginate** and its soln. viscosity. In order to decrease the mol. wt. of the **alginate**, photodegrdn. was proposed. However, UV irradn. of sodium **alginate** in water soln. causes partial decarboxylation and branching of **alginate** mols., instead of the expected chain scission and ring opening photo-reactions. UV photoirradn. was found not be a useful method for decreasing the mol. wt. of the **alginate**.

L6 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 2000:594144 CAPLUS
DN 133:313591
TI Diffusivity of three-dimensional, ionically crosslinked **alginate hydrogels**
SO Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.) (2000), 41(2), 1661-1662
CODEN: ACPPAY; ISSN: 0032-3934
AU Kuo, Catherine K.; Ma, Peter X.
AB This work show that ionically crosslinked Ca **alginate** gels formed with controllable mech. properties, homogeneity, **swelling** behavior and permeability can be tailored specifically for tissue engineering or other biomedical applications.

L6 ANSWER 21 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 2000:261337 CAPLUS
DN 133:94425
TI Controlling Mechanical and **Swelling** Properties of **Alginate Hydrogels** Independently by Cross-Linker Type and Cross-Linking Density
SO Macromolecules (2000), 33(11), 4291-4294
CODEN: MAMOBX; ISSN: 0024-9297
AU Lee, Kuen Yong; Rowley, Jon A.; Eiselt, Petra; Moy, Erick M.; Bouhadir, Kamal H.; Mooney, David J.
AB Mech. and **swelling** properties of **alginate hydrogels** can be controlled by crosslinker type and d. **Alginate hydrogels** were covalently crosslinked with various mols. of different sized and structure, including adipic dihydrazide, lysine, and poly(ethylene glycol)-diamines to control the mech. and **swelling** properties of the **hydrogels**.

L6 ANSWER 24 OF 28 CAPLUS COPYRIGHT 2002 ACS
AN 2002:3512 CAPLUS
TI Study on **calcium alginate** gel beads as oral drugs administration carriers
SO Shenyang Yaoke Daxue Xuebao (2001), 18(6), 406-408
CODEN: SYDXFF; ISSN: 1006-2858
AU Ma, Ping; Zhu, Li; Sun, Shuying; Xin, Yanru; Yang, Jingyan
AB Ca **alginate** gel beads were prepd. by dropping Na **alginate** soln. into CaCl2 soln. The gelation rate of the beads was measured based on wt. changes. The effects of Na-**alginate** concn. (1-4%) and CaCl2 soln. concn. (0.05-0.20M) on the gelation rate were studied. The results indicated a rapid initial decrease and a subsequent slow stage, and the higher CaCl2 soln. concn. (.gtoreq.0.1M)

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was not obvious. The **swelling** property of the dried beads from fully-cured **hydrogels** was studied. It should be noted here that no **swelling** was obsd. in the distd. water and 0.1M HCl (pH 1.0) soln., while in phosphate buffer (pH 6.8) the dried beads **swelled** to the diam. 180% as long as its original diam. before being dried. Such a pH-sensitive **swelling** property could be advantageous to orally-administered drug vehicles. Nifedipine (NP) sustained-release beads were prepd. with **calcium alginate** as a carrier. The release amt. of NP from the beads in vitro was 20-30% at 2 h, 60-80% at 6 h, and >85% at 12 h. The NP release from the gel beads was followed the mechanism of diffusion and erosion.

L6 ANSWER 26 OF 28 CAPLUS
AN 2001:329374 CAPLUS
DN 135:123132
TI pH/temperature-responsive behaviors of semi-IPN and comb-type graft **hydrogels** composed of **alginate** and poly(N-isopropylacrylamide)
SO Polymer (2001), 42(16), 6851-6857
CODEN: POLMAG; ISSN: 0032-3861
AU Ju, H. K.; Kim, S. Y.; Lee, Y. M.
AB Thermo- and pH-sensitive comb-type graft and semi-interpenetrating polymer network (semi-IPN) **hydrogels** were prepd. using Na **alginate** and poly(N-isopropylacrylamide) (PNIPAAm). Comb-type graft **hydrogels** are composed of crosslinked **alginate** network and grafted with PNIPAAm. They exhibited fast pH and thermal responses due to free and mobile graft chains. Comb-type graft **hydrogels** reached an equil. **swelling** and deswelling states within about 10 min. By contrast, semi-IPN **hydrogels** formed a polyelectrolyte complex between carboxyl groups in **alginate** and amino groups in PNIPAAm-NH2, resulting in a relatively compact structure and slow **swelling** and deswelling compared with comb-type graft **hydrogel**. All the **hydrogels** exhibited a reasonable sensitivity to temp., pH and ionic strength of the **swelling** medium.

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L9           54 SORT L8 PY
L10          22 S L9 AND PY<=1998

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L10 ANSWER 5 OF 22 SCISEARCH COPYRIGHT 2002 ISI (R)

AN 96:646086 SCISEARCH

TI PREPARATION AND IN-VITRO RELEASE OF MELATONIN-LOADED MULTIVALENT CATIONIC **ALGINATE** BEADS

SO ARCHIVES OF PHARMACAL RESEARCH, (**AUG 1996**) Vol. 19, No. 4, pp. 280-285.
ISSN: 0253-6269.

AU LEE B J (Reprint); MIN G H; KIM T W

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L Number	Hits	Search Text	DB	Time stamp
1	532	hydrogel WITH alginate	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/19 17:22
7	424	(hydrogel WITH alginate) and (shrink$10 or swell$10 or maintain$10 or uniform$10)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/19 17:25
13	74	(hydrogel WITH alginate) SAME (shrink$10 or swell$10 or maintain$10 or uniform$10)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/19 17:26
-	12791	623/$?.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/19 17:21
-	739	623/$?.ccls. and hydrogel	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:19
-	31	(623/$?.ccls. and hydrogel) and (calcium adj ion$5)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:20
-	0	((623/$?.ccls. and hydrogel) and (calcium adj ion$5)) and alignate	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:20
-	0	(623/$?.ccls. and hydrogel) and alignate	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:21
-	59	(623/$?.ccls. and hydrogel) and alginate	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:21
-	49	((623/$?.ccls. and hydrogel) and alginate) and calcium	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:21
-	20	(((623/$?.ccls. and hydrogel) and alginate) and calcium) and ((623/$?.ccls. and hydrogel) and (calcium adj ion$5))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:25
-	0	((((623/$?.ccls. and hydrogel) and alginate) and calcium) and ((623/$?.ccls. and hydrogel) and (calcium adj ion$5))) and alignate.clms.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:26
-	0	((((623/$?.ccls. and hydrogel) and alginate) and calcium) and ((623/$?.ccls. and hydrogel) and (calcium adj ion$5))) and alginate.clms.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:26
-	0	((((623/$?.ccls. and hydrogel) and alginate) and calcium) and ((623/$?.ccls. and hydrogel) and (calcium adj ion$5))) and calcium.clms.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:26
-	7	hydrogel and alignate and cross$5 and calcium	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:29
-	116	(sodium adj alignate) or (potassi$5 adj alignate)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:30
-	54	((sodium adj alignate) or (potassi$5 adj alignate)) and calcium	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:30

-	2	(((sodium adj alignate) or (potassi$5 adj alignate)) and calcium) and hydrogel	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:39
-	18264	hydrogel	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:40
-	1899	hydrogel and alginate	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:40
-	1274	(hydrogel and alginate) and calcium	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:40
-	1086	((hydrogel and alginate) and calcium) and cross$10	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:42
-	3	(((hydrogel and alginate) and calcium) and cross$10) and (calcium adj releas$10)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:54
-	168	(((hydrogel and alginate) and calcium) and cross$10) and (calcium adj Ion$5)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:56
-	142	((((hydrogel and alginate) and calcium) and cross$10) and (calcium adj Ion$5)) and three$15	USPAT; US-PGPUB; EPO; JPO; DERWENT	2002/02/14 14:58

L6 ANSWER 2 OF 3 CAPLUS
AN 1996:217370 CAPLUS
TI **Injectable bone using calcium** alginate **polymer** substrate.
AU Cao, YiLin; Wang, JinXi; Perkins, Mike; Vacanti, Charles A.
CS Medical Center, University Massachusetts, Worcester, MA, 01655, USA
SO Book of Abstracts, 211th ACS National Meeting, New Orleans, LA, March 24-28 (1996), BIOT-212 Publisher: American Chemical Society, Washington, D. C.
CODEN: 62PIAJ
DT Conference; Meeting Abstract
LA English
AB Biodegradable **calcium** alginate gels were investigated as a means of delivering isolated osteoblasts via injection to det. if these gels would promote engraftment and provide a three dimensional template for new bone growth. Bovine osteoblasts were resuspended in 1.0% sodium alginate to yield a concn. of 100 .times. 106 cells ml, then 0.2g CaSO4 was added to each ml of the admixt. to initiate gel formation. These admixts. were injected in 100 ul aliquots s.c. in 12 nude mice and incubated up to 12 wk in vivo. All **calcium** alginate-osteoblast specimens exhibited new bone formation grossly and histol. as early as 8 wk post injection. 12 wk control specimens consisting of osteoblasts alone or **calcium** alginate without osteoblasts showed no evidence of bone formation. This technique promises a minimally invasive means of delivering autogenous bone to correct or reconstruct facial contour deficiencies.

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1: Biomaterials 2001 Jul;22(14):1961-70 Related Articles, NEW Books, LinkOut

ELSEVIER SCIENCE FULL-TEXT ARTICLE

Multilayer capsules: a promising microencapsulation system for transplantation of pancreatic islets.

Schneider S, Feilen PJ, Slotty V, Kampfner D, Preuss S, Berger S, Beyer J, Pommersheim R.

Department of Endocrinology and Metabolism, University of Mainz, Medical Centre, Germany. feil005@mail.uni-mainz.de

In 1980, Lim and Sun introduced a microcapsule coated with an alginate/polylysine complex for encapsulation of pancreatic islets. Characteristic to this type of capsule is, that it consists of a plain membrane which is formed during a single procedural step. With such a simple process it is difficult to obtain instantly a membrane optimized with respect to all the properties requested for islet transplantation. To overcome these difficulties, it is recommended to build up the membrane in several consecutive steps, each optimized for a certain property. In this study, we have analysed such a multilayer microcapsule for the encapsulation of pancreatic islets. Therefore, empty and islet containing alginate beads were coated with alternating layers of polyethyleneimine, polyacrylacid or carboxymethylcellulose and alginate. By scanning electron microscopy the thickness of the covering multilayer-membrane was estimated to be less than 800 nm by comparison with an apparatus scale. Ellipsometric measurements showed that the membrane thickness is in the range of 145 nm. Neither the encapsulation procedure, nor the membrane-forming step did impede the stimulatory response of the islets. The encapsulation even lead to a significantly better stimulatory response of the encapsulated islets during week three and five of cell culture. Furthermore, the multilayer-membrane did not deteriorate the biocompatibility of the transplanted microcapsules, allowing an easy tuning of the molecular cut-off and the mechanical stability depending on the polycation-polyanion combination used. The multilayer membrane capsule has obvious advantages compared to a one-step encapsulation procedure. These beads guarantee a high biocompatibility, a precisely adjusted cut-off, an optimal insulin-response and high mechanical stability although the membrane is only 145 nm thick.

Publication Types:
- Evaluation Studies

PMID: 11426874 [PubMed - indexed for MEDLINE]

2: J Biomed Mater Res 2001;58(4):358-65 Related Articles, NEW Books, LinkOut

Chitosan-alginate films prepared with chitosans of different

molecular weights.

Yan XL, Khor E, Lim LY.

Department of Pharmacy, National University of Singapore, 10, Lower Kent Ridge Road, Singapore 119260.

Chitosan-alginate polyelectrolyte complex (CS-AL PEC) is water insoluble and more effective in limiting the release of encapsulated materials compared to chitosan or alginate. Coherent CS-AL PEC films have been prepared in our laboratory by casting and drying suspensions of chitosan-alginate coacervates. The objective of this study was to evaluate the properties of the CS-AL PEC films prepared with chitosans of different molecular weights. Films prepared with low-molecular-weight chitosan (Mv 1.30 x 10(5)) were twice as thin and transparent, as well as 55% less permeable to water vapor, compared to films prepared with high-molecular-weight chitosan (Mv 10.0 x 10(5)). It may be inferred that the low-molecular-weight chitosan reacted more completely with the sodium alginate (M(v) 1.04 x 10(5)) than chitosan of higher molecular weight. A threshold molecular weight may be required, because chitosans of Mv 10.0 x 10(5) and 5.33 x 10(5) yielded films with similar physical properties. The PEC films exhibited different surface properties from the parent films, and contained a higher degree of chain alignment with the possible formation of new crystal types. The PEC films exhibited good in vitro biocompatibility with mouse and human fibroblasts, suggesting that they can be further explored for biomedical applications. Copyright 2001 John Wiley & Sons, Inc.

PMID: 11410893 [PubMed - indexed for MEDLINE]

☐ 3: Artif Organs 1999 Oct;23(10):894-903 Related Articles, NEW Books, LinkOut

online

Evaluation of modified alginate-chitosan-polyethylene glycol microcapsules for cell encapsulation.

Chandy T, Mooradian DL, Rao GH.

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A bioartificial pancreas, a medical device entrapping islets of Langerhans (islets) in an immunoisolative membrane, has been regarded as one of the most promising approaches to treat insulin-dependent diabetic patients. In this study, various modifications of alginate-chitosan microcapsules were made such as the inclusion of polyethylene glycol (PEG) and the use of crosslinkers such as carbodiimide (EDC) and glutaraldehyde (GA) in the core and onto the microcapsule membrane surface. A characterization of the modified microcapsules in terms of mechanical stability and albumin diffusion as well as their surface properties using SEM was performed. A mild GA treatment greatly enhanced the mechanical stability of the microcapsules, and this treatment did not affect the coating process of chitosan or PEG. The biological response to such microcapsules was evaluated by microencapsulation of red blood cells (RBC) and subsequent observation of their hemoglobin release. The encapsulated RBC in the PEG-GA coated microcapsules were found to be less hemolytic and had improved stability and biocompatibility. The results suggest the possibility of developing biological assist organs by microencapsulation of mammalian cells such as islets or liver cells in immunoisolative microcapsules in the near future.

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4: Int J Biol Macromol 1997 Aug;21(1-2):47-55 Related Articles, NEW Books, LinkOut

Alginate based new materials.

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Present and future applications of alginates are mainly linked to the most striking feature of the alginate molecule; i.e. a sol/gel transition in the presence of multivalent cations, e.g. Ca2+, almost independent on temperature. These very mild conditions, combined with the fact that alginates are highly characterised and understood both in the liquid and in the gel phase, makes this biopolymer unique compared to other gelling polysaccharides. Only pectins resemble alginate in the sol/gel transition behaviour, but this system can hardly be said to be as well characterised and understood as the alginates. The properties of alginate solutions and gels suggest biomedical and pharmaceutical uses. In this paper, the question of the specifications required by a polymer for applications in some biomedical areas will be discussed.

Publication Types:

- Review
- Review, Tutorial

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ELSEVIER SCIENCE
FULL-TEXT ARTICLE

Rate-controlling biopolymer membranes as transdermal delivery systems for nifedipine: development and in vitro evaluations.

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Membrane permeation-controlled transdermal delivery devices for the controlled delivery of nifedipine were developed using collagen (which was extracted from calf fetus skin) and chitosan membranes as rate-controlling membrane. To increase the stability of nifedipine in the systems, alginate gel was used as drug reservoir. Transdermal devices were fabricated by adhesive sealing techniques. In vitro drug release studies were carried out using modified Franz diffusion cells. Drug release was found to depend on the type of membrane used to control the drug delivery, suggesting that drug delivery is efficiently controlled by the rate-controlling membranes.

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to powder by ball mill. The dentin particles were demineralized by H_3PO_4 solution. The insoluble dentin were then collected. Next, the demineralized-dentin was suspended in the NMGly solution. The pH value of the suspension was adjusted to 1.6 by HCl. The ^{13}C NMR spin-lattice relaxation time, T_1 observation of the NMGly was conducted. When the demineralized-dentin was added to the NMGly solution, the T_1 values of all of the carbons of the NMGly were decreased. This was due to the fact that the NMGly species interacted with the demineralized-dentin.

178. NEW AND INTERESTING FINDINGS CONCERNING CHEMICAL BONDING TO THE COMPONENTS OF HUMAN DENTIN, M. DiRenzo[1], F. ElFeninat[1], J. Xu[2], S. Poulin[3], T.H. Ellis[1], E. Sacher[3], and I Stangel[2]
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Human dentin consists of protein and mineral phases, in the form of a collagen network reinforced with mineral apatite. The bonding of materials to dentin, an important goal of materials research, can be achieved by the reaction of adhesion promoters with either of these phases. Our group is concerned with such bonding, and has used surface-sensitive instrumentation to explore these reactions. Here, we discuss some of our findings with respect to the kinetics of surface demineralization, the mechanisms of attachment of 2-hydroxyethyl methacrylate to collagen, as well as organophosphate reaction with calcium in the mineral phase. The ramifications of our findings will be discussed.

179. APPLICATION OF ALGINATE POLYELECTROLYTE IONOTROPIC HYDROGELS FOR BLOCKING OF MICROSCOPIC CHANNELS IN TEETH

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The idea of blocking the microscopic channels (tubules) in tooth dentine by polymeric materials, in order to decrease the fluid permeability through the native hydrogel and protect against tooth decay, has been developed in our laboratory over the last five years. Recently we have found that calcium alginate hydrogels (CaAH) can be successfully used for the same purpose. Aqueous solutions of alginates gelatinize with di- or tri-valent ions. In this paper we present results of swelling/de-swelling of CaAH obtained from various Ca salts under different experimental conditions, SEM microphotographs of CaAH gels, and their blocking of tubules in the human dentine.

180.

SIMILARITIES AND DIFFERENCES BETWEEN HOMOGENEOUS AND HETEROGENEOUS METAL CATALYZED "LIVING" RADICAL POLYMERIZATION OF STYRENE, METHACRYLATES AND ACRYLATES INITIATED WITH MONO- AND MULTI- SULFONYL CHLORIDES INITIATORS.
V. Percec H.-J. Kim, B. Barboiu and M. van der Sluis. The W. M. Keck Laboratories for Organic Synthesis, Department of Macromolecular Science, Case Western Reserve University, Cleveland, Ohio 44106-7202

The goal of this presentation is to demonstrate that substituted phenylsulfonyl chloride initiate the metal catalyzed "living" radical polymerization of styrene, methacrylates and acrylates under homogeneous and heterogeneous conditions regardless of the nature of their substituent, both in solution and in bulk. Consequently, aryl sulfonyl chlorides can be tailored as extremely efficient mono-, di- and multifunctional initiators for "living" radical polymerization performed in bulk and in solution.